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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



FEBRUARY 29, 1936

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SCIENCE SERVICE PUBLICATION

## SCIENCE NEWS LETTER

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No. 777

The Weekly Summary of

## Current Science

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## SCIENCE SERVICE

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## DO YOU KNOW?

Smyrna in Turkey is now officially Izmir.

The seed stores of birds sometimes start new forests.

Probably no vegetable can be used in more ways than the onion.

Australia's funnel-web spider is scarcely bigger than a housefly, but its bite can kill.

By a new method, monograms may be welded to textiles, so that the initials will stand long wear and washing.

British chemists have produced a new range of dyes which they pronounce perfect for artificial silk made of acetates.

Trunkless fruit trees, resembling bushes, are found to yield more fruit and also to stand wind and winter damage better than trees with trunks.

Two women are superintendents of Indian agencies: Dr. Sophie Aberle, at the United Pueblos Agency, Albuquerque, New Mexico, and Alida Bowler at the Carson Indian School and Agency, in Nevada.

Bread loses practically none of its vitamin B in the baking.

One of the transcontinental air lines has re-routed its planes so that they fly over the Grand Canyon by daylight.

The crab-eating seal was one of the rare specimens collected by the second Byrd expedition to the Antarctic.

Naturalists report that albinos are more common among animals of the rodent order than among other kinds of mammals.

The first finger of a woman's hand is apt to be longer than the third finger, whereas a man's first finger is likely to be short.

The average amount of soil removed from clothes by the dry cleaning process is approximately 5 per cent. of the weight of the garment.

There are three things that children would rather do than listen to a radio, says one psychologist, and they are, in order: 1, go to the movies; 2, listen to an orchestra on the stage; 3, read the comics.

## WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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Will February 29 set our calendar right again? p. 134.

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Is medical training at fault for the high maternal deathrate? p. 134.

Should novice physicians be placed "on trial"? p. 137.

What game bird can spread "rabbit fever"? p. 136.

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Who began the development of cultivated fruits? p. 140.

## PHYSICS

What discovery was made through the use of cosmic rays? p. 132.

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## PHYSIOLOGY

How does pineal gland extract change the development of rats? p. 135.

## RADIO-ASTRONOMY

Does the Milky Way send us radio messages? p. 131.

## ZOOLOGY

What are pandas like? p. 137.

BIOLOGY

# Organs Kept Alive in Tubes To Throw Light on Life

## Apparatus for Circulating Synthetic Blood Through Rabbit's Kidney Shows Complicated Cell Respiration

**O**RGANS removed from the body and kept alive by artificial means are giving Brown University scientists a clue to the secret of how life goes on. Details of the studies which have already led to a new theory of the life-essential process of cell oxidation were reported by Prof. J. Walter Wilson of the department of biology.

Instead of watching the functions of the artificially-living organ as a whole, Prof. Wilson is probing life's secrets by studying under the microscope the activities of the tiny cells which make up the organ.

Heating the organ, a rabbit's kidney in this case, Prof. Wilson noted that the breathing rate of these tiny cells mounted as the temperature rose. At the "coma point" he saw minute liquid-crystal rods within the cells shatter. When poisonous cyanide was added to the synthetic blood stream passing through the artificially-living kidney, these minute rods, called mitochondria, broke up into bits as the kidney died of the poison.

From these and similar experiments, Prof. Wilson concludes that the vital breathing of the kidney cells is governed

by tiny parts within the cells and not by the cell as a unit. He believes the mitochondria play a part in some types of cell breathing, or oxidation as it is called scientifically. He also thinks that other parts of the cell, particularly the nucleus, are involved in cell breathing.

"Cell respiration apparently is not a single simple process," he declared, indicating that further tests would be made to verify the new theory.

For his experiments he uses a perfusion apparatus, developed after eight years of research, which circulates synthetic blood through rabbit kidneys. The "blood" is made to flow by mechanical heart-beats under normal temperature and pressure. By controlling the chemistry of the synthetic blood, which consists of a simple salt solution, red corpuscles from beef blood and oxygen, Prof. Wilson is able to control the rate of oxidation or breathing of the kidney cells.

Prof. Wilson said recently that the delicate mechanism of the kidney, although ideal for his experiments in most ways, is difficult to keep alive more than 15 minutes artificially. This made it necessary to conduct scores of individual tests to arrive at conclusive results. It takes a week to prepare Prof. Wilson's apparatus for a single experiment.

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RADIO-ASTRONOMY

## Listen For Shortwave Radio Signals From Milky Way

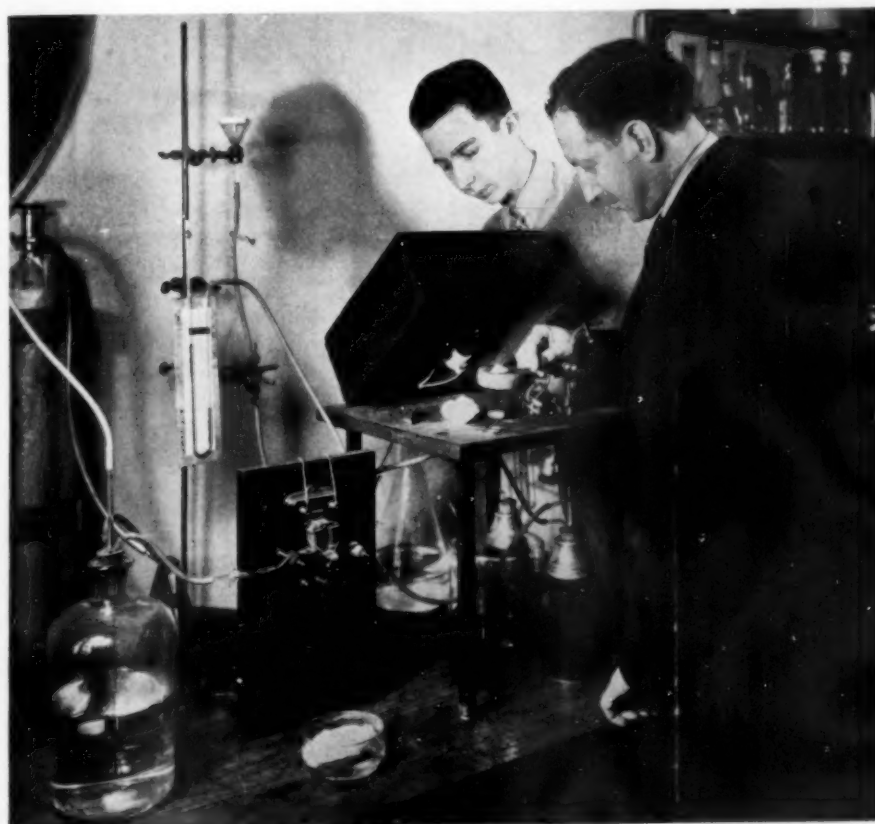
**B**ECAUSE there is a doubt about the theory that short radio waves reach the earth from stars in the Milky Way, two California Institute of Technology scientists have erected delicate apparatus in the center of a ten-acre farm to study the origin of the mysterious radiation.

The research, being conducted by Dr. G. W. Potapenko and D. F. Folland, follows studies made by Dr. Karl G. Jansky of the Bell Telephone Laboratories on static. No signals as yet have been received.

In his experiments, conducted in New Jersey, Dr. Jansky observed three kinds of static, the third of which he speculated originated in the stars in the Milky Way, or reached the earth as the result of secondary radiation.

Mr. Folland expressed the opinion that it is probable the short waves, found by Dr. Jansky to be 14.6 meters in length, do not originate in the stars, but come from some other place.

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### KEEPS ORGANS ALIVE

This complicated apparatus, which took eight years to perfect, keeps a rabbit's kidney alive outside the body. Synthetic blood is kept circulating through the organ, while Prof. J. Walter Wilson, Brown University, (right) investigates the breathing process of the minute cells that make up the organ. Working with Prof. Wilson is Victor M. Emmel, graduate assistant.



## ASTRONOMY

# Most of Light In Night Sky Comes From Sun, Not Stars

Displays of "Northern Lights" Have Same Explanation, Solar Electrons Produce Light in Atoms of Air

THE HIKER caught out after dark on a moonless night may feel very thankful for that faint illumination which he calls starlight. But he is wrong in thinking that it all comes from the stars. Only about one-fifth of it is of stellar origin. Most of it is produced by particles of electricity, hurled from the sun at enormous speeds, and "striking sparks" as they collide with the molecules of the upper atmosphere.

Prof. Georges Déjardin, of the University of Lyons, France, describes the experiments which have led scientists to accept this theory. (*Reviews of Modern Physics*, Jan.)

One may wonder how the sun can be responsible for this light when it, itself, is on the other side of the earth. The answer to this is that the electrons are bent around by the earth's magnetic field so that almost as many fall on the far side, where it is night, as fall on the near side.

Displays of "Northern Lights" are quite similar to the light of the night sky when examined with the spectrograph, and have, in large measure, the same explanation. The night sky is brighter at times of the year when the northern lights are also most in evidence, says Prof. Déjardin.

Some nocturnal light, while also coming from the sun, reaches the earth by another route. Just as sunlight is reflected from the moon, this glow is reflected to us from small pieces of matter which fly about in empty space.

## Lighter Near Horizon

The hypothesis that most of the night light is produced in the earth's atmosphere is verified by the fact that it is stronger near the horizon than directly overhead. When we look straight up, we look through less atmosphere and therefore see less of the light.

Examination of the night sky with a spectrograph shows very nearly what one would expect from collisions of electrons from the molecules of our atmosphere. The photographic plates show

abundant evidence of the presence of oxygen and nitrogen.

These spectra did hold some surprises for physicists, however. The usual oxygen spectrum shows some gaps in its systematic scheme of lines. These gaps have been given the name of "forbidden lines." But in the night sky spectrum these forbidden lines are conspicuously present. After this discovery it was found possible to produce in the laboratory oxygen spectra in which these lines also appear. Most of the light from the nitrogen in the air also comes from a rather rare form of the gas called "active nitrogen." This form of nitrogen has also been produced in the laboratory and appears only when the gas is in a very rarefied state.

Other substances whose spectra can be detected in the night sky include water vapor and argon.

The extreme reaches of the upper atmosphere have long been supposed to consist of the very light gases, hydrogen and helium. But the nocturnal spectrograms indicate that oxygen and nitrogen extend as far as the confines of the atmosphere.

*Science News Letter, February 29, 1936*

## PHYSICS

## New Tool of Science Is Itself Little Known

IT MAY seem strange to the layman to find scientists using something about which they possess scanty knowledge as a tool to find out more about the physical laws underlying nature. But such is the case for cosmic rays.

No less an authority than Prof. Arthur Compton, Nobel prize-winner from the University of Chicago, states, "... the immense individual energies of these (cosmic) rays give them a unique place in the physicist's atomic artillery."

"Used as a tool," he adds, "they have resulted in the discovery of the positron, they seem about to become an adjunct of the telescope for collecting

astronomical data, and they now afford a means of extending our knowledge of the laws of electricity and of the properties of matter to energies a thousand times greater than are available from any other known source."

As only one example, cosmic rays are being made to tell something about magnetism *inside* a magnet. Science has long studied with success the effects of external magnetic fields of magnets, and exact laws governing the behavior of all manner of matter in such fields is fairly well known. But what happens inside the magnet is still highly obscure.

## Each Bit a Small Whole

The obvious method of taking the magnet apart to see what makes it work is useless, for once broken each little piece exerts its own external field and the original situation is repeated only on a much smaller scale.

Cosmic rays provide the tool whereby a magnet can be kept whole and yet something of what happens inside can be determined at the same time. The trick is to allow cosmic rays to penetrate the magnet. In fact, it is quite hard to prevent them from doing this because of their great energy and piercing power.

Because cosmic rays are largely electrical in nature they are bent in passing through the magnet and the strength of the field inside the magnet can be determined.

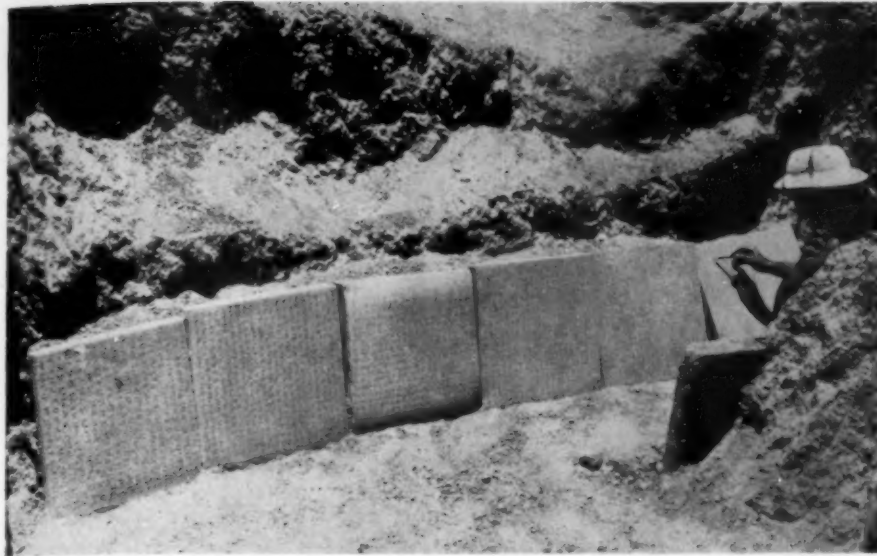
## Origin Still Puzzling

The situation is somewhat comparable with the measurement of the force of a hurricane at sea by deciding by simple calculation how much a ship is blown off its course.

Prof. Compton, writing in the *Physics Forum of the Review of Scientific Instruments* (February), summarizes what science now knows about the nature of cosmic rays but admits that the more basic question of their origin still proves puzzling. There exist hypotheses to explain the origin but all of them, he declares, lack the amount of experimental proof required for general acceptance.

"The cosmic origin of cosmic rays, though perhaps not established," he states, "appears now more probable than ever. How they originate is still obscure; but increased knowledge of their characteristics has helped to limit the types of hypotheses that are admissible."

*Science News Letter, February 29, 1936*



TABLETS OF XERXES

*Just unearthed, they tell history and geography of famous Persian empire.*

## ARCHAEOLOGY

## Tablet Reveals Extent Of Famous Xerxes' Empire

SCHOOL children may now have to bound the famous Persian empire of King Xerxes. A stone tablet unearthed in Iran (Persia) lists for the first time for modern historians the lands that the Persian conqueror welded into the greatest empire the ancients had ever seen.

Discovery of this tablet, and six others of importance, is announced by the Oriental Institute of the University of Chicago. The tablets were found stored in a room of King Xerxes' army garrison at his palace in Persepolis. It is believed the stone inscriptions were intended as "cornerstone" foundation deposits.

Provinces of King Xerxes just prior to 480 B.C. included such proud lands as Babylonia, Assyria, Egypt, Punt, Media, part of Greece—"the Ionians that dwell in the Sea and those that dwell beyond the Sea." The tablet indicates an empire extending northeast beyond modern Afghanistan, southwest to borders of modern Ethiopia, southeast to the Indus river in India, and northwest through most of Asia Minor.

The new texts are of special significance to religious history, says Dr. John A. Wilson, acting director of the Oriental Institute. One tablet tells of Xerxes' success in putting down enemies of the religion of Zoroaster, who staged an uprising that has not heretofore been known. Teachings of Zoroaster, who upheld a faith in one god, were apparently influential in the reign of Xerxes' father, Darius the Great, and it now is shown that priests and worshippers of the old gods tried a useless religious rebellion to restore their deities when Xerxes came to the throne.

### Linked With Esther

Xerxes is sometimes identified as the King Ahasuerus of the Bible, Persian King who made the Jewish maid Esther his Queen.

The Oriental Institute expedition has also unearthed solid plaques of gold and silver used as foundation deposits in the great audience hall of the palace at Persepolis, probably dating from Darius' time, about 515 B.C.

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A science "hobby" laboratory for the whole neighborhood, with charge made for materials only, has been opened at Milburn, New Jersey.

## PHYSICS-BIOLOGY

## "Uncertainty Principle" Extended to Include Biology

**You Cannot Tell All About the Atoms in Living Cell Without Destroying the Object You Wish to Analyze**

THE FAMOUS "uncertainty principle" of physics was extended to the sciences of biology and psychology by Prof. Niels Bohr, Copenhagen Nobelist, in a lecture at the Warburg Institute, London.

According to the uncertainty principle as it applies in physics, it is impossible to tell simultaneously just where a subatomic particle is, and how fast it is going. If you know one of the two facts, the conditions of experiment prevent you from exactly knowing the other. This principle has powerfully shaken the hold of mechanistic determinism, or what has been styled "scientific predestination" on the thinking of physicists.

Prof. Bohr called attention to an analogous situation in biology. It has been contended that if you knew all about every atom in a cell you would know all about the cell. But, Prof. Bohr pointed out, you cannot determine any facts about the atoms that make up the cell without tearing the cell to bits, thereby destroying the very makeup you

wanted to find out about. You cannot completely analyze life without destroying life.

An analogous "uncertainty principle" also obtains in psychology, the noted Danish scientist continued. Analysis in this science is infinitely more complex than it is in physics. The things in psychology which you may wish to examine are changed by the very act of examination; a picture of a mental situation becomes a different situation when attention is fixed on some part of it.

Racial differences also introduce an uncertainty element into psychology, Prof. Bohr claimed. If a Dane or an Englishman gets sufficiently close to the mental culture of a Chinese or a Japanese, he ceases to be really a Dane or an Englishman, so the situation is changed and the attempted analysis is baffled.

Prof. Bohr made a strong plea for mutual aid among scientists, regardless of nationality, in winning the common fruits of science, and especially in the conquering of racial prejudices.

*Science News Letter, February 29, 1936*

## CHRONOLOGY

# Despite Leap Years, Calendar About Three Hours In Error

**Modern Calendar of Pope Gregory XIII Corrects Earlier Errors But Still is 24 Seconds Off Annually**

**W**HEN Pope Gregory XIII reformed the calendar in 1582, with the advice of the astronomer Christopher Clavius, he corrected an error that had existed in the earlier Julian calendar of nearly ten minutes a year, but even his calendar is not perfect.

The average length of the year according to the Gregorian calendar is about 24 seconds longer than it should be—the time that the earth takes for a complete trip in its orbit around the sun. But this remaining error is so small that it will not be until about the year 4600 that our calendar will be as much as a day in error. At present the difference that has accumulated since Pope Gregory's time is only about three hours, not enough to bother anyone.

The whole difficulty in making a satisfactory calendar comes from the fact that the earth does not turn an even number of times while it is making a trip around the sun. Instead, it turns almost  $365\frac{1}{4}$  times. More accurately the number can be expressed as 365.24219, but even that is not exact. The two periods of time are incommensurable—one cannot be expressed precisely in terms of the other, no matter how many figures are used after the decimal point. Consequently, the best calendar is the one that most closely approximates this relation.

## Named for Caesar

The Julian calendar, named after Julius Caesar, by whose decree it was introduced in 45 B.C., was due to the Roman astronomer Sosigenes, who had placed the length of the year at  $365\frac{1}{4}$  days. As the extra fraction of a day amounted to one day every four years, the leap year was invented. By having a 366-day year every fourth year, the difference was mostly accounted for. But because the actual year is about ten minutes shorter than Sosigenes assumed, by 1582 the calendar was 13 days out of step, and the beginning of spring came on March 12, instead of March 25, where Caesar had placed it. If this had been allowed to continue, it would even-

tually have come in the middle of winter, and as this would have put Easter and other religious festivals in the wrong time of year, Pope Gregory ordered the reform that bears his name.

Instead of restoring the beginning of spring to the 25th, however, he made it the same as in the year 325 A.D., the date of the Council of Nicaea, which had set the rules for determining the date of Easter. Ten days were dropped bodily from the calendar, which made the necessary correction. Then, in order to prevent a recurrence of the error, he ordered that in the future years marking the beginning of a century should not be leap years unless they were di-

visible by four hundred. Other years would have the extra day if their number was divisible by four. Thus, in the Gregorian calendar there are 97 leap years every four centuries, instead of a hundred, as Caesar had it. For this reason the year 1900 was not a leap year, but 2000 will be one.

But this difference of three days every four hundred years is a little too much of a correction by about 24 seconds a year. This amounts to a day in 3,000 years, so by the year 4600 spring will start on March 22, unless some other change is made in the meantime. By that time the Eastern Orthodox Church will have a more accurate calendar than ours. They adhered to the Julian calendar until 1923. Then they adopted the Gregorian but with a slightly different leap year rule. This is that century years shall be leap years only when their numbers divided by nine give a remainder of 2 or 6. This will not be out of step with ours until the year 2800 which, in the Gregorian calendar, will be a leap year, but in the Eastern reckoning it will be an ordinary one.

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## MEDICINE

# Medical Training Could Reduce Maternal Deathrate

**L**ACK of training of medical students should be remedied to prevent needless deaths of mothers in childbirth and to cut maternal deathrate, it was advocated in discussions at the annual congress on medical education held under the auspices of the American Medical Association.

Proper training in medical school, it was suggested, could do as much for childbirth deaths as public health measures have already done to lower death rates from typhoid and diphtheria.

Better training of medical students in the management of childbirth and education of expectant mothers to demand the best scientific care during the period before their children are born as well as the time of the birth are the means advocated for reducing maternal mortality.

The general practitioner devotes almost a third of his time to obstetrics, but the subject dealing with the man-

agement of childbirth is allotted only 4 per cent. of the time allowed for the entire medical course, Dr. Robert H. Riley, state health officer of Maryland, pointed out.

Need for better training of medical students in obstetrics was also stressed by Dr. Charles B. Reed of Chicago.

"Sentimentalists everywhere are maintaining that maternity cases are not getting adequate medical care and that in consequence the American mortality and morbidity rate is much higher than in other countries," Dr. Reed said.

Although the charge cannot be substantiated because of dissimilarity in collecting and analyzing statistics in different countries, "social theorists and salaried altruists make a great ado over this assumption and use it freely as an argument for the passage of paternalistic and unconstitutional laws together with a prodigal expenditure of public money," he observed.

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## PHYSIOLOGY

# Gland Extract Checks Growth But Speeds Growing-Up

**Extracts From Pineal "Seat of the Soul" Makes Rats Become Adult Early But Fail to Reach Full Size**

**A** GLAND extract that has the somewhat paradoxical effect of checking growth at the same time that it speeds the growing-up process, is reported by Drs. L. G. Rowntree, J. H. Clark, and Arthur Steinberg of Philadelphia and Dr. A. M. Hanson of Fari-bault, Minn. (*Science*, Feb. 14)

The extract is from the pineal gland, the tiny, cone-shaped structure in the head, which the French philosopher, Descartes, once called the "seat of the soul." The extract was prepared by Dr. Hanson. Its strange effect was discovered in studies made on rats by the Philadelphia scientists at the Philadelphia Institute for Medical Research and at research laboratories at the Philadelphia General Hospital.

The extract was given to five generations of rats. Its effect was to retard the rate of growth, at the same time speeding up development and hastening the onset of adolescence in the offspring of treated parents. The great-great-grandchildren of treated rats weighed less than half as much as untreated animals of the same age. However, their teeth erupted when they were between 3 and 5 days old, instead of the usual 8 or 10 days; their eyes opened within five days instead of about 15 days after birth.

The end result, the scientists report, is dwarfism with precocious development and over-sized sex organs.

## Unsolved Mystery

The function of the pineal gland and its purpose or use in the body has always been one of the unsolved mysteries of medical science. The studies on rats treated with pineal gland extract cannot be taken offhand to mean that the normal function of the pineal gland is to check growth and speed sexual development, Dr. Rowntree cautions in his report. If that were the case, it would imply that removal of the pineal gland would result in faster growth and slowed development. Operations already performed on a small number of

rats for removal of the pineal gland have not brought about such results. Further study will be needed to clear up the mystery of the pineal and to translate the facts now known into practical knowledge useful for treating humans.

In the first generation of rats treated with pineal extract "no effect is apparent other than moderate loss of weight and phenomena suggestive of sex excitation and early breeding," the scientists' report reads. "In the second generation there is definite retardation in growth, with mild precocity in gonadal development. In subsequent generations, the third to the fifth, there is accruing retardation in growth with accruing acceleration in gonadal and bodily development. Precocious 'dwarfism' with relative macrogenitalism are the outstanding result. In addition eye anomalies, ocular diseases and blindness are extremely common."

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## GENETICS

## Pea Plant Grown by Mendel Given to University

**O**NE of the most treasured mementoes of the modern science of genetics, a pressed specimen of a pea plant grown by Gregor Mendel himself, became the property of the University of Pennsylvania at a special ceremony during the mid-year convocation.

The specimen is the gift of the monastery at Brno, Czechoslovakia, formerly called Brünn, where Mendel as teacher performed the experiments that laid the foundations of all modern plant and animal breeding and where he later ruled as abbot. It is one which he preserved and mounted himself. As arranged for presentation to the University, it is under glass, with the coat-of-arms of the monastery stamped over the inscription beneath it. Accompanying the specimen is one of Mendel's autograph signatures, which are now very rare.

The specimen itself, well preserved in spite of its seventy years of age, is



## FAMOUS PEA PLANT

*This pressed plant, well-preserved for its age, is one of those originally used by Mendel in his basic experiment on genetics. It has now been sent to the United States. The inset shows the autograph of Mendel which accompanied the specimen as a gift from the monastery at Brno, Czechoslovakia, to the University of Pennsylvania.*

about eight inches high and consists of a stem with several leaves and flowers. Only certain duplicate specimens which Mendel thus preserved were available as gifts to other institutions. There were originally six such specimens; there now remain in his monastery only two.

While on a tour of Europe last summer Dr. Samuel W. Fernberger, professor of psychology at the University of Pennsylvania, visited Brno and told Eduard Urban, a resident of that city, of his great interest in the Mendel relics there. Prof. Urban, in turn, informed the monastery authorities of Dr. Fernberger's enthusiasm for the collection.

At the same time, also, the attention of the monastery authorities was called to the fact that, through his research in chromosomes, Dr. Clarence E. McClung, professor of zoology at the University of Pennsylvania, had done much toward explaining the mechanism underlying Mendel's Laws.

As a result, the monastery authorities expressed a desire to give to the University one of the duplicate specimens.

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## ASTRONOMY

**Smallest Closest Object  
Discovered in Heavens**

**A** GREAT rock hurtling through space had its photograph taken by astronomers eager to chart its heavenly path before it disappeared from view.

This new minor planet is the smallest object in astronomy's annals except the meteorites which smash into the earth. It came closer to the earth than any other thing in the heavens, except possibly one or two comets.

It is known as the Delporte object, after the Belgian astronomer Prof. E. Delporte who discovered it on February 12.

Here are the Harvard Observatory figures showing the new asteroid's claims to fame: Size—One-third mile or only one twenty-five-thousandth of the earth's size. Weight—Five hundred million tons, about the same as a small mountain. Distance away—When first observed was within two or three million miles of earth.

The "object" might also be considered a comet in the opinion of some astronomers, but it will probably be given planetoid status and a name.

*Science News Letter, February 29, 1936*

## MEDICINE

**Case of "Rabbit Fever"  
Acquired From Pheasants**

**P**HEASANTS can apparently transmit to man the disease known as tularemia or rabbit fever, Drs. R. U. Leser and D. L. Wilbur reported at a recent staff meeting of the Mayo Clinic. At least, the physicians have no other evidence of how their patient acquired the disease.

Tularemia is caused by a "germ" and is widespread among rabbits, squirrels, rats and mice. Man gets the disease chiefly by the blood of infected rabbits running into cuts on the hands or by bites of wood ticks that have fed on infected animals. Pheasants are supposed to be very resistant to the disease and therefore rarely responsible for spreading it.

The disease is nothing to trifle with but usually disappears under treatment. Until more is known of whether pheasants can have the disease themselves or whether they carry infected ticks on their bodies, the physicians advise early treatment for pheasant hunters who de-

velop soreness of finger or arm and a fever.

The patient in this case, a farmer's wife, had developed a small sore at the base of the nail on the right little finger after she had dressed many pheasants. Little attention was paid to it, however, even after she had come to the hospital, as she complained of a cough, fever, chills, nausea, and pains in the chest and knees which were at first considered symptoms of influenza. When her condition did not improve, blood tests were made and showed the presence of the tularemia "germ." Treatment with antitularemic goat serum, prepared according to the directions of Dr. Lee Foshay of the University of Cincinnati College of Medicine, resulted in her recovery.

*Science News Letter, February 29, 1936*

## ASTRONOMY

**Model of Great Telescope  
To Guide Its Construction**

**A** SMALL telescope, just a tenth the size of the great 200-inch telescope now building for Mt. Palomar, Calif., is being constructed as a miniature "first edition" of the giant instrument with which astronomers a few years hence will extend the limits of the known universe.

This became known here when the Observatory Council of California Institute of Technology announced that the giant mounting that will hold and direct at the sky the world's record 200-inch sky mirror will be built in Philadelphia by the Westinghouse Electric and Manufacturing Company. The tenth scale working model will permit rigorous tests to be made in advance of actual construction.

The designs of the mounting are being made by the California Institute, which is also building the working model. The model tests will insure the necessary extreme rigidity of the large instrument, the best type of bearings, guarantee ease and steadiness of rotation of the polar axis, and the perfection of all parts.

After these tests have been made, the engineers of the Westinghouse company will assist the engineers and draftsmen of the Institute of Technology in the completion of working drawings, for use in their shop.

The scale of the telescope is shown by the fact that the tube, carrying the 200-inch mirror at its lower end, will be about 20 feet in diameter and 55 feet long.

*Science News Letter, February 29, 1936*

**IN SCIENCE**

## GENERAL SCIENCE

**Conquests of Science  
Needed in Four Fields**

**F**OUR great fields of conquest for science of the future were outlined by Watson Davis, director of Science Service, in making the opening evening address of the Georgia Press Institute at the University of Georgia. They are:

1. The conquest of two great killers, cancer and organic heart disease, and that troublesome endemic, the common cold.

2. Development of energy resources that will free us from our dependence upon fossil fuel of the past, such as oil and coal. This probably means the harnessing of solar energy to do practical work, or the release of sub-atomic energy.

3. Understanding of mental disease and the make-up of human personality to the extent that peace and fair dealing may dominate the conduct of individuals, communities and nations.

4. Discovery of the secret of life, that is, the difference between inanimate and living matter, and the creation of artificial life.

"We may never see these conquests," Mr. Davis warned, "and it may well take years of research before a glimmer of effective results is obtained."

In the last 15 years science has made notable advances, Mr. Davis told the Georgia editors. One of the most encouraging developments, in Mr. Davis' opinion, is the serious attention that newspapers now give to the reporting of science news.

*Science News Letter, February 29, 1936*

## PSYCHIATRY

**Prizes Offered For Study  
Of Mental Diseases**

**P**RIZES of \$50 and of \$25 are offered by the New England Society of Psychiatry for the best researches in mental disease conducted by younger workers. Physicians, psychologists, social workers, or others are eligible. Dr. Harlan L. Paine is secretary.

*Science News Letter, February 29, 1936*



# EN FIELDS

## MEDICINE

### "Trial" Licenses Urged to Weed Out Misfit Doctors

ONE WAY to get better medical care for the public would be to put young doctors on a sort of probation period before they are given permanent licenses to practice medicine.

Such a scheme of "trial" licenses for young doctors, to be made permanent when the young medicos have proved themselves, was suggested by Dr. Irvin D. Metzger of Pittsburgh, president of the Federation of State Medical Boards of the United States.

"Exploiters could be eliminated before they became socially grounded," Dr. Metzger pointed out in explanation of the plan. "Quasi-ethical nuisances could be curbed before they brought reproach on the entire profession. Amateur specialists could be halted before they demoralized the faith of the community in the integrity of the profession. Bunglers in practice, because of irresponsibility or lack of adaptability, would be offered an opportunity to seek a more suitable vocation. All would be urged by this subsequent check-up, to do their best in improving their ability to serve their community and their state."

One of the reasons social workers and politicians call for medical regulation by the state, Dr. Metzger asserted, is that too many recent physicians have too much of the business-like attitude.

A means of discovering the deeper factors of personality desirable in a physician will have to be found before long by administrators of medical laws, he said. One step in this direction would be the "trial" license granted for about five years, after which a renewal for permanency would be required.

*Science News Letter, February 29, 1936*

## ZOOLOGY

### Giant "Raccoon-Bears," Displayed At Museum

See Front Cover

PANDAS, among the rarest and most puzzling of large fur-bearing animals, will be represented at the Ameri-

can Museum of Natural History by a pair of handsome specimens which have been placed on display.

A photograph of the pair appears on the cover of this week's SCIENCE NEWS LETTER.

Pandas live in the higher plateaus of interior Asia. They are about the size of black bears, which they resemble in many respects, but they are apparently more nearly related to the raccoons. Their fur is strikingly divided into golden-yellow and dark-brown areas, and they have curious spectacle-like rings around their eyes. Their fur is much valued by Chinese natives, but owing to the rarity of the animals it does not enter Western commerce.

*Science News Letter, February 29, 1936*

## CHEMICAL ENGINEERING

### Use Smelly Gas in Mains To Prevent Disasters

A CHEMICAL cousin of the fluids which give the skunk its powerful odor is being used to tell the presence of leaks in gas mains. Such leaks recently caused two deaths and 41 illnesses at Belleville, Ill.

Dr. A. C. Fieldner, chief chemist of the U. S. Bureau of Mines here, declared that calodrant, which is now being used in Belleville to prevent recurrence of the disaster, is an evil smelling product obtained in the manufacture of petroleum products.

One of its pungent constituents is the chemical known as ethyl mercaptan, a sulfur compound, whose odor is best described as a mixture of garlic, onions, decayed cabbage, sewer gas and ancient eggs. Ethyl mercaptan is chemically related to the odor-producing fluid of the skunk, except that the latter is higher-powered.

Ethyl mercaptan, purer but more costly than calodrant, has such a powerful odor that only eight pounds of it in a million cubic feet of gas will show up any slow leaks in gas joints or fixtures in the home.

If forty pounds per million cubic feet of gas is used, engineers can detect leaks in the mains far underground. The chemical, in fact, was used for this very purpose after the serious Los Angeles earthquake of three years ago.

Odorizing gases, recommends the U. S. Bureau of Mines, should be used in all gas lines which carry carbon monoxide as a constituent of their gas.

*Science News Letter, February 29, 1936*

## METEOROLOGY

### Pessimistic Thermometers Needed by Weather Bureau

NEW and more pessimistic thermometers for winter use loom as a likely necessity for U. S. Weather Bureau purchase, if we are to have any more winters like the present one. The cheerful souls in the Bureau's instrument department have hitherto graded their standard winter-time thermometers only to 60 degrees below zero, and these have already been taxed nearly to capacity; several stations in the blizzard-swept Northwest have turned in reports in the lower minus-fifties.

For temperatures as low as this, mercury thermometers are of no use. Mercury freezes—turns into a solid metal like lead or silver—at around 40 degrees below zero Fahrenheit. Mercury thermometers are contemptuously referred to as "summer thermometers" in parts of the country where winters are something to brag about.

In such places alcohol thermometers are the only kind that can be used. Alcohol is a difficult stuff to freeze, as everyone knows who has poured it into his automobile radiator. The freezing point of pure ethyl alcohol is 117.3 degrees below zero Centigrade, which is approximately 211 degrees below on the commonly used Fahrenheit scale. If a night got that cold, most of us wouldn't be bothering much about it.

Thermometers do not have so much difficulty with the upper end of the ordinary weather range, except when their tubes are made too short and they burst. Weather Bureau thermometers used in such dependably hot places as Death Valley and some parts of Nevada are graded as high as 140 degrees above zero Fahrenheit. Summer temperatures have climbed into the hundred-thirties in these back porches of Purgatory, but so far none of these 140-degree instruments has been burst by an over-ambitious mercury column.

To get back to the present: the Weather Bureau stated that they have had some special low-temperature alcohol thermometers, used by Antarctic expeditions, that read as low as 90 degrees below zero. They did not state whether they intended having a batch of these made up to send out over the country generally.

*Science News Letter, February 29, 1936*

ASTRONOMY

# In March Comes Spring

## Stars Bring Forecast of Warmer Days as Winter Constellations Move Toward the Southwest Skies

By JAMES STOKLEY

**O**RION has now moved over to the southwest in the evening skies and along with it the retinue of brilliant stars that made glorious the winter heavens. As usual, it may be recognized by the three stars in a row that form the warrior's belt—these are now horizontal. Directly above them is Betelgeuse, and below Rigel, part of the same constellation.

About as high, and farther south, is Sirius, brightest star of the night time sky, marking Canis Major, the greater dog. Above is Procyon, in Canis Minor, the lesser dog. A little to the west of the zenith are the twins, Gemini,—Pollux to the south and Castor to the north. Lower, and a little farther north, is Capella, in Auriga, the charioteer, and below is Taurus, the bull. Aldebaran, the star marking the bull's eye, is part of the Hyades, the V-shaped group that outline the face.

In the eastern sky, the place where these were a few months ago, now appear several constellations that at that time were not to be seen until late at night. The Great Dipper, then low in the north, is swinging around, into the northeast, the bowl uppermost. It is well known how the pointers, the two stars of the bowl farthest from the handle, indicate the direction of Polaris, the pole star. The handle of the dipper, too, can be used to find other groups. If, in imagination, its curve is extended around to the south, it brings one to Arcturus, in Boötes, and still farther south to Spica, in Virgo.

### Lion and Crab

Directly above Virgo is the lion, Leo, of which the principal parts are the sickle, a hook-shaped group of stars, with Regulus at the end of the handle, to the south, and a triangle of stars below. Between Leo and Gemini is a rather faint constellation, Cancer, the crab, which is chiefly of interest because, like its neighbors, and Virgo and Taurus as well, it forms part of the zodiac, the

path of the sun, moon and planets in their wanderings through the sky.

If one has a clear horizon to the south, it is possible to see there part of the great constellation of Argo, the ship, in mythology representing the one that carried Jason and the Argonauts on their famous quest in search of the golden fleece. At latitude 40 degrees, for which these maps are prepared, the brightest star in the group does not rise, but from points south of latitude 38 degrees, that of Richmond, it can be seen at this time. Its name is Canopus, and it is the second brightest star in the heavens, only Sirius surpassing it. Argo is such a large constellation that it is subdivided into four parts. Canopus marks Carina, the keel. Puppis, the bow, is just left of Canis Major. Farther to the left are Pyxis, the compass, and Vela, the sail.

### Only One Planet

Mars is the only planet that can be seen in the evening sky, but it sets about two hours after the sun, before the times of the maps, 10 p. m. on the first, 9 on the 15th and 8 on the 31st. Two other planets are in the sky, only they require telescopic aid to see them. In the constellation of Leo, a little below Regulus, is Neptune, which before 1930 was considered the outermost member of the

solar system, the family of planets revolving around the sun, and of which the earth is for us the most important. It was just 90 years ago that this planet was added to our knowledge, for before that Uranus, which the English astronomer, Sir William Herschel, had discovered in 1781, was supposed to have that distinction.

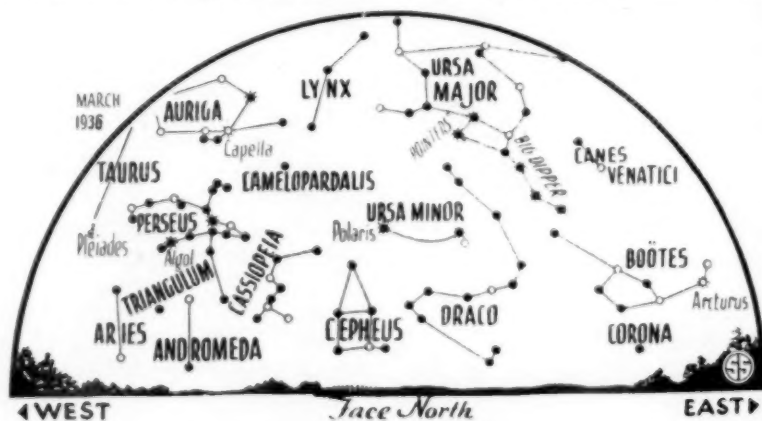
After Uranus had been discovered, astronomers calculated the orbit in which it should move, and predicted its future motion. For a time it followed the forecasts, but early in the nineteenth century it was found to have deviated slightly from its expected path, even though the gravitational pull of all the other known members of the solar system had been considered and allowed for.

### Intolerable

By 1845 the difference had become, astronomically, intolerable—it was nearly two minutes of arc, about a fifteenth the apparent diameter of the moon, and almost enough to be noticed with the naked eye.

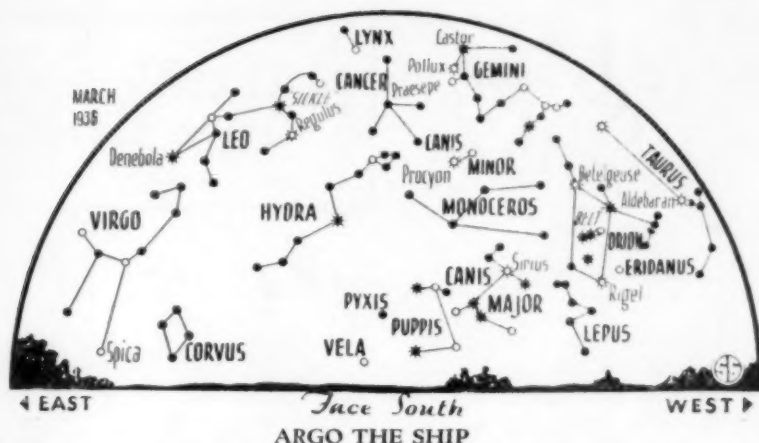
"But suppose there were another planet, so far undiscovered, out beyond. Might not its attraction sometimes pull Uranus one way, sometimes the other, and so account for the deviations?" This thought came to several astronomers, but to them remained only an idea. Two, however, proceeded to work upon it. One was a young Englishman, John Couch Adams. By laborious ef-

◊ \* ◊ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



### STARS OF THE SPRING

Now in the east you may be able to find the spring stars coming into view. Follow the handle of the Great Dipper around its curve and you will locate Arcturus.



The famous craft that carried Jason and the Argonauts on their famous quest in search of the golden fleece is represented in the heavens by a constellation that may be seen low in the south in March.

forts he calculated where a planet would have to be to produce such an effect. Due partly to the fact that British astronomers did not have the proper star charts, and partly to the disinclination of those in official position to recognize this young and unknown man, his communications were pigeon-holed.

In the meantime, Urbain Joseph Leverrier, in France, knowing nothing of Adams' work, had set himself to the same problem, and had also solved it, in 1846. He was more fortunate in his choice of a correspondent, for he sent his results to J. G. Galle, in Berlin. The German, fortunately, had a new map of the stars in the part of the sky where Leverrier had said the new planet would be. Immediately after receiving his letter, Galle looked in the place mentioned, and there he found a strange object that did not appear on the charts. This was the planet Neptune, as it was later named.

Of course, when news of the discovery reached England, the importance of the work of Adams, who had placed his planet in just about the same position, was recognized at once, but too late to secure the honor of the discovery for England entirely. But the verdict of history has been to share the honor equally with Adams and Leverrier. Both attained outstanding rank in the astronomical circles of their respective countries, and also of the world.

### In Opposition

On the fifth of this month Neptune is in opposition with the sun. This means that the two bodies are in directly opposite directions from the earth, so it rises just as the sun sets. At this time also, Neptune is closest the earth, but is still at a distance of 2,714,210,000

miles. Large as this seems, it is about ten thousand times farther to the nearest star. Like all the planets, its sole source of illumination is the sun, and with it so far away, this light is very feeble. Its brightness in the sky is therefore that of an eighth magnitude star, two steps fainter than the dimmest visible to the naked eye. It can be seen, however, with small telescopes.

The other planet in the evening sky this month is still fainter. This is Pluto, which was discovered in 1930, and took away from Neptune the honor of being the most distant from the sun. It is now in the constellation of Gemini, but is of the fifteenth magnitude so that only very large telescopes reveal it.

### Romantic Story

The discovery of Pluto, at the Lowell Observatory, Flagstaff, Arizona, is also a romantic story. This observatory was founded by the late Percival Lowell, of a prominent Boston family, who died in 1916. Even after the discovery of Neptune there had remained some very slight irregularities in the motion of Uranus, and Lowell calculated from these where a still more distant planet might be. A search was made for the planet, with photographic telescopes, before his death, but was unsuccessful. But in 1929 a new instrument had been presented to the observatory by the founder's brother and biographer, A. Lawrence Lowell, then president of Harvard University. A young amateur astronomer, Clyde Tombaugh, was employed to use it, and soon after he began his work the new planet was found, in almost the same part of the sky that Lowell had predicted. Since then several very famous astronomers have stated that Pluto could not possibly have

produced an effect great enough to have been detected in this way. The fact remains, however, that as a result of Lowell's prediction, and from the observatory he founded and directed, the planet was discovered. Undoubtedly future generations will remember him, like Herschel, Adams and Leverrier, as one who was responsible for the adding of a new planet to the solar system.

### Spring at Last

The most important event in the astronomical calendar for March is scheduled for the 20th. On that date, at 1:58 p. m., eastern standard time, the sun, which has been moving northwards through the sky since last December, crosses the equator, and this, according to our convention, marks the beginning of spring. This is the point of the sun's path through the sky called the vernal equinox, because then the day and the night are supposedly of equal length. Actually, there is the effect of refraction, by which the sun's light is bent as it passes through the earth's atmosphere. This makes it appear higher than it really is, and makes it seem to rise a little early, and set a little late. So, on the twentieth, the sun will be above the horizon several minutes longer than it is below.

The evenings will be moonlit during the first week of the month, and again at the end. Apogee, the point at which the moon is farthest from earth, occurs on the 9th, at 11 p. m., E.S.T., with it 252,450 miles away. On the 23rd, at 4 a. m. it will be in perigee, nearest earth, only 221,900 miles distant. The moon is full on March 8 at 12:14 a. m., E.S.T.; at last quarter on the 16th at 3:35 a. m., new on the 22d at 11:14 p. m., and at first quarter on the 29th at 4:22 p. m.

*Science News Letter, February 29, 1936*

Weather predictions play an important part in modern warfare in laying plans for airplane maneuvers, gas attacks, and long-range gunfire.

## RADIO

March 3, 3:15 p. m., E.S.T.

PLANT GROWTH SECRETS—Dr. P. W. Zimmerman of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

March 10, 3:15 p. m., E.S.T.

ADVENTURES IN COLOR—Charles Bittinger, artist-physicist of Washington, D. C.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.



## ASTRONOMY

# Star Is Found to Have Mass 23 Million Times the Earth's

**Heaviest Known Eclipsing Double Star Found at Harvard; Larger Part Has Radius of 10 Million Miles**

**T**HE heaviest eclipsing double star ever known, 23 million times as heavy as the earth and seventy times as heavy as the sun, has been found by the Harvard College Observatory. Its mass is thus 138,000,000,000,000,000,000,000,000 tons—138 with twenty-seven ciphers after.

The star has been known to astronomers for some time as twenty-ninth Canis Majoris, but the fact that it holds a record for weight was unknown until Dr. Sergei I. Gaposchkin of the Harvard staff established this through a study of hundreds of photographs of the heavens taken at the Observatory. The star is a brilliant one and is easily visible to the naked eye as it sits in the southern sky under Sirius, close to the constellation Orion. It is seven thousand light years distant and one of the hottest stars in the sky.

Its diameter is estimated to be more than four thousand times that of the earth.

With the discovery of the great weight of the star, Dr. Gaposchkin has also established for the first time that number twenty-nine is a double eclipsing star, composed of two giant parts revolving about one another and hiding each other at regular intervals. It was this eclipsing property of the star that enabled Dr. Gaposchkin to determine its mass.

Measurements of how long one star is hidden behind the other and of the distance between the two stars were used to determine the effect of the gravitational forces on the bodies and thus to obtain their weight. According to Dr. Gaposchkin's calculations, the larger star of the pair comprising the eclipsing system is forty times as heavy as the sun and has a radius of ten million miles, about twenty-three times that of the sun. The smaller star has a mass thirty times as great as the sun and a radius of seven million miles.

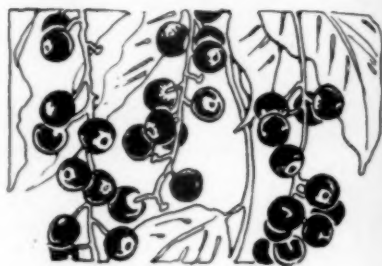
Gravitational behavior of the stars was studied through an examination of the changes in light coming from the stars and of changes in their spectra, all of which were recorded on photographic plates. Although these changes have also been known to astronomers for some time, Dr. Gaposchkin is the first to discover and measure them accurately and thus to complete the data needed to fix the size of the star. Scientists previously have known of only one eclipsing double star with a mass even close to that of number twenty-nine. This star, AO Cassiopeiae, found in the constellation of that name, is composed of parts nearly equal in weight, neither of which, however, is as massive as the greater star in number twenty-nine. AO Cassiopeiae is barely visible to the naked eye.

*Science News Letter, February 29, 1936*

## NATURAL HISTORY

## NATURE RAMBLINGS

by Frank Thone



### Lazy Legatees

**H**OW LAZILY contented we are, with the inheritance we have received from our ancestors of the New Stone Age!

With hardly any important exceptions, all the cultivated plants, all the domesticated animals, practically all the arts and applied sciences we have (excepting only those dependent on metals) were discovered and developed by men we would patronizingly call savages, or at most barbarians, if we could make their acquaintance today.

Yet the woods and fields are full of wild plants, many of which are at least as good as the wild fruits, the wild grains, the wild vegetable crops which our less favored forebears first used as they found them, then cultivated in practically their original forms, and finally improved to something approaching their modern states of excellence.

The wild cherries of Eurasia, for example, are no better for either size or flavor than the wild cherries of America which we reject in their present state as too sour, or bitter, or acrid, and which we do not care to take the trouble to improve by selection and breeding. Similarly we neglect our wild crab-apples.

Our wild plums are as good as many a cultivated variety, just as they grow. We do gather them, a little, but as for trying to breed them up for better size or higher disease resistance—no, we stick to the Old World varieties that some Stone Age tribal wise man started on the road of betterment. At most, we condescend to admit native species to miscegenous matings, to produce



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hardy hybrids. But we do not give them a chance, on their own.

Wild animals we serve with equal lack of enterprise. Our forgotten Neolithic grandsires tamed intractable wild horses, cattle, sheep, swine. They at least made captives of goats and camels—those two can hardly be called tamed or domesticated even yet, after ten thousand years in the corral.

But we, with deer, elk, antelope, bison, and swarms of other valuable mammals, and with our supposedly superior

mental resources, can do no better than kill them wholesale. Our even more remote ancestors of the Old Stone Age could do that; and even they killed only for meat, not for the "fun" of seeing a victim fall kicking, or for the bragging vanity of mounting his stuffed head on the wall.

Is it any wonder that our poor beasts eye us with bewilderment, and sometimes with something that looks uncomfortably like a mild contempt?

*Science News Letter, February 29, 1936*

## ENGINEERING

## Harvard Ice Studies Show How Frost Destroys Roads

**H**UGE economies, through the construction of improved frost-resistant highways, are expected to result from important discoveries concerning frost action in soils, which have been made by Prof. Arthur Casagrande of the Harvard Graduate School of Engineering.

Outstanding among his findings in this pioneer research is that engineers have greatly underestimated the tremendous ice pressures that form beneath highways in winter, causing the roads to heave and crack.

He found, for example, that the pressure exerted by crystallizing ice against the soil in which it is confined is not constant for all freezing temperatures, as has been heretofore believed, but increases in proportion to the amount the temperature falls below the freezing point. Thus at low temperatures tremendous ice pressures, far exceeding those expected under the old theory, form beneath the highways. If the freezing is sufficiently slow, it was found, ice layers may continue to grow indefinitely.

The experiments were conducted in a special "cold room" laboratory for soil research, which Prof. Casagrande installed at Harvard last year. In this laboratory, one of the finest of its kind in the world, natural ice action in soils can be imitated and controlled at will.

The research was undertaken after Prof. Casagrande had participated with the United States Bureau of Public Roads and the New Hampshire State Highway Department in field observations. In many instances roads were

found to be heaved six inches beyond expectations and under extreme conditions the heaving exceeded a foot. This led Prof. Casagrande to the belief that in certain soils the water in the voids will not merely freeze but that ice crystals will continue growing, gradually forming layers of considerable thickness.

"It is this additional water, segregated in form of ice, which causes heaving resulting in an uneven road surface," Prof. Casagrande has explained. "Irregular heaving causes concrete pavements to break and in severe cases may lead to their destruction. During the spring thaw the liberation of large quantities of water brings about a supersaturation of the soil, which becomes so very soft that it affords insufficient support for heavy traffic loads. In this condition macadam and oiled gravel pavements may be completely destroyed by truck traffic."

"In clean sand and gravel we have found no growth of ice layers, either in field or laboratory observations. Such materials are, therefore, used extensively in highway construction in form of a thick foundation, in places where the underlying soil would cause serious trouble if it were penetrated by frost to any considerable depth."

"The use of insulating materials is being considered to prevent deep frost penetration beneath modern pavements. The question of finding an efficient and economical method of insulating subgrades against frost penetration is also being investigated in the Harvard laboratory."

*Science News Letter, February 29, 1936*

## MEDICINE

## Uncle Sam to Save Leper's Baby From Dread Disease

**O**NE BABY whose mother is a leper is going to be saved from the stigma of being born in a leper colony. Uncle Sam is playing godfather in a very practical way to this as yet unborn infant, whose name will never be disclosed. The child will also be saved from contracting the disease that afflicts his mother.

The mother, a leper, was treated at the federal leprosarium at Carville, La., and was apparently cured, or as the doctors put it, the disease was "arrested." She was allowed to return, on parole, to her husband and home and there led the life of a normal married woman.

After a few years, however, fresh signs of leprosy appeared and the woman—whose name is also a secret known only to the officers of the U. S. Public Health Service—returned to the Public Health Service hospital for lepers at Carville. There it was discovered that she was to become a mother.

She is now undergoing treatment again, but when the time comes for her child to be born, she will be taken, under special precautions, to another hospital. As soon as the child is born, he will be taken from his mother and cared for in the nursery of this general hospital, just as any other child would be. When he is old enough to travel, he will be taken to his mother's family.

*Science News Letter, February 29, 1936*

## The Philosophy of Physics

By MAX PLANCK

The dean of living physicists, and winner of the Nobel Prize, in this book sums up his philosophy of physics. A work of commanding interest. \$2.00

## Men of Science

By J. G. CROWTHER

Remarkably illuminating biographies of Davy, Faraday, Joule, Thomson (Lord Kelvin), and Maxwell—who in one century revolutionized the course of science throughout the world. \$3.50

W. W. Norton & Co. 70 Fifth Ave., N. Y.



# •First Glances at New Books

## Biology

**PROTOPLASM**—William Seifriz—*McGraw-Hill*, 584 p., \$6. Prof. Seifriz, who has devoted his whole professional career to a patient, determined, and resourceful attack on the stubborn secrets of the life-stuff we call protoplasm, here brings together all the fruits of his own labor and the work of other investigators. From every angle he looks at protoplasm; he attacks it with every available tool—optics, electricity, mechanics, chemistry, many others. Insofar as "explanation" of a phenomenon consists in its more searching analysis and examination, and more complete and accurate description, Prof. Seifriz has here contributed substantially to the "explanation" of life.

*Science News Letter, February 29, 1936*

## Zoology

**DOG ENCYCLOPEDIA**—Will Judy—*Judy Publ. Co.*, 462 p., \$5. Dog owners who are not expert in their own right on the care and dosing of dogs will find this one-volume encyclopedia highly useful. It tells about the various breeds of dogs, their origin (so far as known), their qualities and usefulness; what may ail them and what to do about it. Some of the articles are mildly scientific, some are humorous little essays.

*Science News Letter, February 29, 1936*

## Science

**THE ENDLESS QUEST: 3000 YEARS OF SCIENCE**—F. W. Westaway—*Hillman-Curl, Inc.*, 1080 p., illus., 48 plates, \$5. American edition of a book published in England in 1934. See review in the *SCIENCE NEWS LETTER* of December 15, 1934.

*Science News Letter, February 29, 1936*

## Engineering

**TABLES FOR POWER-SERIES CALCULATIONS INVOLVING INDEPENDENT VARIABLE OF TWO HARMONIC COMPONENTS**—Thomas C. McFarland—*Univ. of Calif. Press*, pp. 191-233, 50c.

*Science News Letter, February 29, 1936*

## Botany

**FERNS OF THE VICINITY OF NEW YORK, BEING DESCRIPTIONS OF THE FERN-PLANTS GROWING NATURALLY WITHIN A HUNDRED MILES OF MANHATTAN ISLAND. WITH NOTES**—John Kunkel Small—*Science Press*, 285 p.,

illus., \$2.50. A well-illustrated regional pteridophyte flora, covering an area rich both in ferns and in persons interested in ferns. Bringing the two groups together, it will serve a very useful purpose in the world, and should bring at least a little profit, as it certainly will bring much credit, to the veteran botanist who produced it.

*Science News Letter, February 29, 1936*

## Bacteriology

**PRINCIPLES OF BACTERIOLOGY**—Arthur A. Eisenberg, Mabel F. Huntley, and F. E. Colien—*Mosby*, 378 p., \$2.75. The sixth edition of a well-known textbook, that has been going since 1918. Considerable new material has been introduced, especially in sections dealing with relatively "new" diseases like psittacosis, and with rapidly developing subjects such as allergy.

*Science News Letter, February 29, 1936*

## Marine Zoology

**A NATURAL HISTORY OF THE SEAS**—E. G. Boulenger—*Appleton-Century*, 215 p., \$3. Mr. Boulenger is known on both sides of the Atlantic as one of the best-informed of English students of natural history, especially aquatic natural history; and what he knows he can tell in most interesting style. In this book he reviews the whole pageant of "whatsoever passeth through the paths of the sea," from protozoa to marine mammals, illustrating his talk (it is more like casual talk than learned writing) with many halftones, and with clever drawings by L. R. Brightwell.

*Science News Letter, February 29, 1936*

## Nature Study

**OUR WONDERFUL WORLD**—Frances Jenkins Olcott—*Little, Brown*, 299 p., \$2.50. A book that will appeal to at least the more thoughtful kind of child; a wonder-book filled with understandable essays about all manner of things, from ants and grasses to stratosphere balloons and the New York skyline, by authors from Solomon to Fabre. Lots of pictures, and all of them good.

*Science News Letter, February 29, 1936*

## Psychology

**PSYCHOLOGY FOR THE AVERAGE MAN**—H. Clay Skinner—*Bruce Humphries*, 119 p., \$1.25. An interesting, pocket-sized volume for the person who wishes a layman's introduction to this subject.

*Science News Letter, February 29, 1936*

## Psychology

**THE PSYCHOLOGY OF GETTING GRADES**—*Lucas Bros.*, 90 p., \$1. A delightfully humorous attack upon this weighty problem. The work is anonymous and purports to be based on "the author's experience as an undergraduate student who made Phi Beta Kappa without studying more than the average student . . . and as assistant in the psychology department of two large universities." One suspects, however, that only the professor himself could have written these keen comments.

*Science News Letter, February 29, 1936*

## Gardening

**GARDENING WITH PEAT MOSS**—F. F. Rockwell and W. G. Breitenbucher—*Bruce Humphries*, 72 p., \$1.50. Many home flower growers, especially in urban areas, are much discouraged by the poverty of the soil they have to struggle with. In this book, the possibilities of a material long and widely used by professional gardeners and greenhousemen are set forth, with well-illustrated practical directions.

*Science News Letter, February 29, 1936*

## Ornithology

**FOOD HABITS OF COMMON HAWKS**—W. L. McAtee—*Govt. Print. Off.*, 36 p., 5c. To altogether too many people, all hawks are still "chicken-hawks" to be shot on sight if possible. This pamphlet should do much toward correcting the situation.

*Science News Letter, February 29, 1936*

## Medicine

**SOCIALIZATION OF MEDICINE**—E. R. Rankin—*Univ. of North Carolina Press*, 112 p., 50c. This handbook, compiled for the schools holding membership in the High School Debating Union, presents general, affirmative and negative references for debates on the subject of socialization of medicine. The references are from writings of physicians and others who have discussed the problem extensively.

*Science News Letter, February 29, 1936*

## Juvenile

**STORY PICTURES OF FARM FOODS**—John Y. Beaty—*Beckley-Cardy*, 192 p., 70c. A picture-story book about roasting ears and tomatoes, butter and cream, cherry pies and even dates and oranges, for children in the big-print-reading stage.

*Science News Letter, February 29, 1936*



## Astronomy

**STARS AND TELESCOPES**—James Stokley—*Harper*, 319 p., 49 illus., \$3. The establishment of a number of planetaria in this country, with auxiliary exhibits of telescopes, historical astronomical instruments, etc., has aroused a good deal of public interest in the tools of the astronomer, as well as in the wonder-inspiring discoveries he makes with them. Mr. Stokley, who is in charge of the Fels Planetarium of the Franklin Institute in Philadelphia, has built his book to meet this new line of interest, as well as to impart a comprehensive idea of the heavens themselves and both the glory and the mechanics thereof. Mr. Stokley, Science Service astronomy writer, uses as part of his illustrations a set of the star maps with which his articles in the SCIENCE NEWS LETTER have been illustrated.

*Science News Letter, February 29, 1936*

## Chemistry

**A BRIEF COURSE IN QUALITATIVE CHEMICAL ANALYSIS**—Louis J. Curtman—*Macmillan*, 249 p., \$2.25. A one-semester course in the subject as taught at the College of the City of New York. Considerable emphasis is placed on equation writing and calculations. The approach is from the standpoint of the laws of chemical equilibrium and the ionization theory.

*Science News Letter, February 29, 1936*

## Medicine

**THE BRAIN AS AN ORGAN**—Frederic and Florence Wertham—*Macmillan*, 538 p., 166 plates, \$7.50. Psychiatrists and neurologists will welcome this book which Dr. Adolf Meyer characterizes as a volume "of unrivaled value." It is a technical book, not suitable for lay reading.

*Science News Letter, February 29, 1936*

## Psychology

**SOCIAL PSYCHOLOGY: THE PSYCHOLOGY OF ATTRACTION AND REPULSION**—John Jeffrey Smith—*Bruce Humphries*, 468 p., \$2. A printed revision of a textbook already used in mimeographed form by the author who is professor of psychology at Muskingum College. It is intended to be suitable for those with only an elementary knowledge of psychology.

*Science News Letter, February 29, 1936*

## Zoology

**THE BOOK OF DOGS**—Stanley West—*Appleton-Century*, 426 p., illus., \$4. About three-fourths of this book consists of pictures of standard breeds of dogs, with brief descriptive text, some dog of

established record being chosen to represent his breed. The remainder is about equally divided between illustrated suggestions on the training of dogs, and a discussion of the show points of the various breeds.

*Science News Letter, February 29, 1936*

## Hygiene

**PRINCIPLES OF HYGIENE**—Thomas A. Storey—*Stanford Univ. Press*, 524 p., \$3.50. Revised edition. A text for college students with the emphasis on principles of hygiene. Practice of hygiene is to be presented in a second volume. The author's idea is that hygiene cannot be adequately practiced without sound knowledge of its principles and of the causes of health and diseases. The reader who wants to know, for example, why the body needs rest, why excesses are bad for the health, what part heredity plays in health or disease, will find the answers in this volume, as well as much other factual information about health.

*Science News Letter, February 29, 1936*

## Bacteriology

**ELEMENTARY BACTERIOLOGY**—Joseph E. Greaves—*Saunders*, 562 p., \$3.50. Third edition of a well-planned and successful textbook.

*Science News Letter, February 29, 1936*

## Photography

**PRESS PHOTOGRAPHY**—James C. Kincaid—*American Photographic Publishing Co.*, 281 p., illus., \$3. This book is a text for amateur or professional camera men who wish to learn press photography. It is the most comprehensive and readable book of its kind and it contains many effective illustrations.

*Science News Letter, February 29, 1936*

## Evolution

**EVOLUTION FOR EVERYBODY**—Henshaw Ward—*Grosset & Dunlap*, 354 p., \$1. Originally published under title, *Evolution for John Doe*.

*Science News Letter, February 29, 1936*

## Fish Culture

**HEWITT'S TROUT RAISING AND STOCKING**—Edward R. Hewitt—*The Marchbanks Press*, 71 p., \$2. A practical guide for fish culturists, whose tribe is ever increasing.

*Science News Letter, February 29, 1936*

## Biology

**COLD SPRING HARBOR SYMPOSIA ON QUANTITATIVE BIOLOGY**, Vol. III—*Biological Laboratory, Cold Spring Harbor, L. I., N. Y.*, 359 p., \$3.75. The summer symposia at the Cold Spring Harbor Biological Laboratory, exploring borderland and pioneer fields of biological research, have achieved deserved note among biologists. Last summer's sessions were given over to a discussion of the application of quantitative methods in biological investigation—admittedly a difficult matter, but one which is not beyond the reach of modern ambition and modern instruments. Of special interest in the present volume of reports are the papers on photosynthesis and other biocatalytic phenomena.

*Science News Letter, February 29, 1936*

## Ornithology

**THE BIRDS OF NEVADA**—Jean M. Linsdale—*Cooper Ornithological Club, Berkeley, Calif.*, 145 p., 1 map, \$4. An annotated checklist with bibliography and index. Should be valuable to Western ornithologists.

*Science News Letter, February 29, 1936*

## Hobbies

**HANDBOOK FOR THE AMATEUR LAPIDARY**—J. Harry Howard—*Pub. by author*, 504 *Crescent Ave., Greenville, S. C.*, 140 p., \$2. Grinding and polishing stones is one of the most absorbing and fascinating of hobbies, and can easily produce profit as well as beauty. Mr. Howard has followed it a long time, and is therefore able to offer instructions both detailed and practical.

*Science News Letter, February 29, 1936*

## Botany

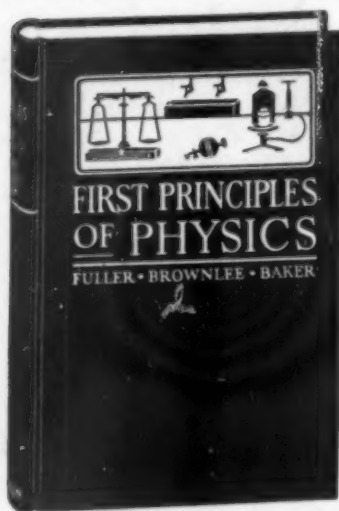
**A FLORA OF BEXAR COUNTY, TEXAS**—Sister Mary Clare Metz, 214 p.; **A FLORA OF NELSON COUNTY, KENTUCKY**—Sister Rose Agnes Greenwell, 204 p., *Catholic University of America*, paper, each \$1. Two very carefully worked out botanical "keys" that are worthy additions to the gratifyingly growing local-flora literature, and will be useful teaching and field aids in their respective regions.

*Science News Letter, February 29, 1936*

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# PHYSICS AND HUMAN PROGRESS

RECENT EVENTS throw into striking relief the contributions which science in general and physics in particular have made to human progress. The first event, the death of General Greely recalls the heroic struggle of his party of twenty-five men some fifty years ago. For nearly three years they lost all contact with the outside world, and when the rescue party found them only six were alive.



The experience of Greely's party brings to mind the famous expedition of Sir John Franklin and its tragic end, and the later expedition of Scott, which successfully reached the South Pole, but also ended in tragedy when the party perished before they could get back to their base.

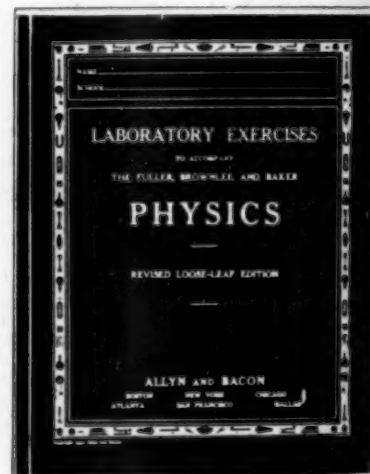
These heroic expeditions and those of Peary and Amundsen, which though more successful, were nevertheless filled with hardship, are monuments to the indomitable will in the heart of man to surmount the obstacles that stand between him and the mastery of his world.

Physics has banished most of the terrors of arctic exploration. It has conquered the twin horrors of darkness and isolation by its development of the electric light and of the radio.

The latest evidence of these splendid contributions to the progress of science is best presented in the little message *Alive and Well*. These three words recently flashed forth from Little America to inform the world that Lincoln Ellsworth, American explorer, and Herbert Hollick-Kenyon, Canadian Royal Air Force flyer, are safe and sound after their daring Antarctic flight.

Physics gives the explorer, in the Arctic or in the interior of vast continents, conquest over space. With the camera in his airplane, he can explore and accurately record the geography of wide horizons which could not be mapped by months of travel on the earth.

Physics has gathered the corners of the earth ever closer and closer together by means of great ships that float, long trains that run on shining tracks, arched bridges that balance from shore to shore, wires that carry voices, and radios that make the world a whispering gallery.



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